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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/799,502

03/11/2004

Yi-Hui Chang

1176/220

8274

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04/13/2007

LIU & LIU

444 S. FLOWER STREET SUITE 1750

LOS ANGELES, CA 90071

EXAMINER

LAWSON, MATTHEW P

ART UNIT

PAPER NUMBER

2871

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/799,502

Applicant(s)

CHANG, YI-HUI

Examiner

Matthew P. Lawson

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12 Feb 2007</u> | 6) <input checked="" type="checkbox"/> Other: <u>Foreign Ref.</u> |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed 22 June 2006 has been received and entered.
Claims 27-52 are currently pending in this application.

Information Disclosure Statement

2. An information disclosure statement (IDS) was filed on 12 February 2007. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Response to Arguments

3. Applicant's arguments with respect to claims 27-52 have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 27-30, 40-44, 49, 51 and 52** are rejected under 35 U.S.C. 102(b) as being anticipated by Nagai et al. (Nagai), US PGPub. No. 2002/0135553 A1.
6. Regarding claims 27 and 36, Nagai discloses a backlight device comprising:
- a. a two dimensional array of point light sources, said point light sources being LEDs (LED array 61); and
 - b. a light guide plate (microlens array 63) comprising a first surface facing the array and a second surface emitting light passing through the light guide plate, wherein the first surface comprises a two dimensional array of convex structures (microlenses), with each convex structure aligned with a point light source in the array (Fig. 1; ¶ [0005, 0110, 0112]).
7. Regarding claims 28 and 29, Nagai discloses the convex structures to be formed on the first surface of the light guide plate, as discussed under claim 27 above. Since Nagai discloses the convex microlenses to be formed in a two dimensional array corresponding to a plurality of pixels (¶ [0010]), Nagai thereby discloses the convex structures to be distributed uniformly in both directions of the light guide plate, also thereby disclosing the convex structures to be formed in a matrix.

8. Regarding claim 30, Nagai further discloses the first surface to comprise a planar surface from which the convex structures extend (Fig. 1). Specifically, since the convex microlenses are coplanar as disclosed by Nagai, they thereby extend from a planar surface.

9. Regarding claim 40, Nagai further discloses the cross-section of the convex structure to reduce in area from the proximal end portion of the structure to the distal end. Specifically, Nagai discloses the convex microlenses to be hemispherical in shape and reducing in area towards the LED array, as shown in Fig. 1.

10. Regarding claims 41 and 42, since Nagai discloses the convex microlenses to be hemispherical, as discussed under claim 40 above, Nagai thereby discloses the cross-section at both the proximal and distal end portions to be of a circular shape.

11. Regarding claim 44, Nagai further discloses the point light sources to be positioned relative to the convex structures so that the light emitted from the point light sources is substantially received through the convex structures (Fig. 1).

12. Regarding claim 49, Nagai further discloses a liquid crystal display device comprising:

- a. a backlight device as discussed under claim 27 above; and

- b. an LCD panel (67) positioned relative to the light emitting surface, receiving light emitted from the light-emitting surface (Fig. 1; ¶ [0014-0015]).
- 13. Regarding claims 51 and 52, Nagai discloses a backlight device, comprising:
 - a. a two dimensional array of point light sources; and
 - b. a planar light guide plate comprising a first surface facing the array of point light sources and a second surface emitting light passing through the light guide plate, wherein the first surface comprises a two dimensional array of convex protrusions, with each protrusion aligning with a point light source in the array of point light sources, as discussed under claim 1 above.
- 14. Specifically, Nagai discloses microlenses as protrusions, protruding out from the light guide plate towards the array of point light sources, as shown in Fig. 1.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. **Claim 37** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai in view of Harbers et al. (Harbers), US PGPub. No. 2005/0073495 A1.

18. Claim 36 has been anticipated by Nagai as discussed above.

19. Nagai fails to expressly teach the two dimensional LED array to be supported by a back plate.

20. However, Harbers discloses a backlight panel for an LCD, said panel comprising a two-dimensional LED array supported by a reflective back plate (Harbers, Abstract; ¶ [0019]).

21. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a back plate as disclosed by Harbers in the LCD backlight device of Nagai, in order to efficiently recycle the light of, for example, the LEDs (Harbers ¶ [0019]).

22. **Claim 39** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai in view of Yu et al. (Yu), US Pat. No. 7,081,933 B2.

23. Claim 27 has been anticipated by Nagai as discussed above. Nagai further discloses the convex structures to have a hemispherical shape, as shown in Fig. 1.

24. Nagai fails to teach the convex structures to have a frustum or truncated cone shape.

25. However, Yu discloses a light guide plate comprising convex structures, wherein the convex structures are hemispherical or frustum shaped (Yu, col. 4, lines 5-13).

26. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the convex structures of Nagai in the shape of a frustum as taught by Yu, since Yu is evidence that the frustum shape and hemispherical shape are equivalent structures in the art.

27. **Claims 46 and 47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai in view of Nishio et al. (Nishio), US Pat. No. 5,598,280 A.

28. Claim 27 has been anticipated by Nagai as discussed above.

29. Nagai fails to teach the second surface of the light guide plate to comprise a light guide pattern.

30. However, Nishio discloses a light guide plate including microlenses, wherein a second surface of the light guide plate comprises a jagged light guide pattern or uneven surface (Nishio, Figs. 6-8; col. 6, lines 12-46).

31. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the second surface of the light guide plate of Nagai comprise a jagged light guide pattern, as taught by Nishio, in order to obtain a uniform angular distribution of the light (col. 6, lines 47-53).

32. **Claim 48** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai in view of Beeson et al. (Beeson), US Pat. No. 5,396,350.

33. Claim 27 has been anticipated by Nagai as discussed above.

34. Nagai fails to expressly disclose the light guide plate to be comprised of PMMA or polycarbonate.

35. However, Beeson discloses a backlight guide plate and microprism array for a liquid crystal display device, said light guide plate to preferably consist of for example, polycarbonate, and said microprism array to consist of, for example, polymethylmethacrylate (Beeson, col. 5, line 36-col. 6, line 18).

36. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the light guide plate of Nagai out of PMMA or polycarbonate, since PMMA and polycarbonate are exemplary transparent solid polymers for use in a light guide plate, as taught by Beeson, and it has been held to be

within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice. *In re Leshin*, 125 USPQ 146.

37. **Claims 45 and 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai.

38. Claims 27 and 49 have been anticipated by Nagai as discussed above. Nagai also teaches the use of a diffusion sheet in the case of a direct view apparatus (§ [0113]).

39. Nagai fails to expressly disclose the placement of the diffuser sheet.

40. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a diffusion sheet either disposed adjacent to the second surface of the light guide plate or at another location between the LCD panel and the second surface of the light guide plate, in view of the teachings of Nagai, in order to make the luminance distribution from the light guide plate even (§ [0113]), and since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

41. **Claims 27, 36, 40, 51 and 52** are further rejected, and **claims 31-35 and 43** are rejected as being unpatentable over Harbers in view of Beeson and Kitamura, Japanese Laid-Open Patent Application No. 2004-047297.

42. Regarding claim 27, 31, 36, 37, 51 and 52, Harbers discloses a backlight guide comprising:

- a. a two dimensional array of LEDs (24) mounted on a backplane; and
- b. a light guide plate (diffuser 28) comprising a first surface facing the array of point light sources and a second surface emitting light passing through the light guide plate (Harbers, Fig. 2).

43. Harbers fails to disclose the light guide plate to comprise a two dimensional array of convex structures.

44. However, Beeson discloses a light guide plate (110) comprising a two dimensional array of convex protrusions (90) (Beeson, Fig. 12).

45. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the light guide plate of Beeson in the backlight device of Harbers, for the advantages of energy efficiency and uniformity as taught by Beeson (Beeson, col. 2, lines 5-11).

46. The backlight device as taught by the combination of Harbers and Beeson still fails to expressly teach the convex structures to be aligned with the point light sources.

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47. However, Kitamura discloses a light guide plate (8) comprising convex protrusions (11) insertion-fitted to and thereby aligned with an LED light source (5) via a recess (12) directly facing the light source (Figs. 2, 3).

48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the backlight device as taught by the combination of Harbers and Beeson by aligning the convex structures with the point light sources, as taught by Kitamura, in order to improve the efficiency of the light guide plate, as taught by Kitamura (Kitamura, ¶ [0009]).

49. Regarding claims 32 and 33, claim 31 is unpatentable over the combination of Harbers, Beeson, and Kitamura as discussed above.

50. The combination of Harbers, Beeson, and Kitamura fails to teach a portion of the light source to be not entirely received within the corresponding recess of the convex structure, or at least a portion of each point light source to remain outside the corresponding recess.

51. However, it would have been obvious as a matter of design choice to one of ordinary skill in the art at the time of the invention to [modification of Ref. A], since applicant has not disclosed that having each point light source not entirely received by the corresponding recess or having at least a portion of each point light source remaining outside the corresponding recess solves any stated problem or is for any particular purpose, and it appears that the invention would perform equally well with the

point light source configuration as taught by the combination of Harbers, Beeson, and Kitamura.

52. Regarding claims 34 and 35, claim 31 is unpatentable over the combination of Harbers, Beeson, and Kitamura as discussed above.

53. The backlight device as taught by the combination of Harbers and Beeson fails to expressly teach the point light sources to be positioned relative to the convex structure such that light emitted from the point light source is substantially received through the convex structure.

54. However, Kitamura teaches point light sources to be positioned relative to the convex structure such that light emitted from the point light source is substantially received through the convex structure, as well as having each point light source juxtaposed to the convex structure (Figs. 2, 3).

55. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the backlight device as taught by the combination of Harbers and Beeson by the teachings of Kitamura, in order to improve the efficiency of the light guide plate, as taught by Kitamura (Kitamura, ¶ [0009]).

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56. Regarding claim 40, claim 31 is unpatentable over the combination of Harbers, Beeson, and Kitamura as discussed above.

57. The convex structures of both Beeson and Kitamura both have a tapered shape, wherein the convex structure reduces in area towards the light source. Accordingly, claim 40 would be obvious.

58. Regarding claim 43, claim 40 is unpatentable over the combination of Harbers, Beeson, and Kitamura as discussed above.

59. Kitamura teaches the point light sources to be juxtaposed to the convex structure, as discussed under claim 35 above. Accordingly, claim 43 would have been obvious.

60. **Claim 38** is rejected over Harbers, Beeson, and Kitamura, as applied to claim 31 above, and further in view of Koike et al. (Koike), US Pat. No. 5,528,709.

61. Claim 31 is unpatentable over the combination of Harbers, Beeson, and Kitamura, as discussed above.

62. The combination of Harbers, Beeson, and Kitamura fails to disclose the recess to be an arc-shaped recess.

63. However, Koike discloses a backlight for a liquid crystal display device, including an arc-shaped recess formed concave to the LED point light source (Koike, Fig. 5B).

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64. Koike is analogous art because it solves the same problem of achieving uniform brightness in a backlight for a liquid crystal display device.

65. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the recess as taught by the combination of Harbers, Beeson, and Kitamura in an arc-shaped manner as taught by Koike, for example, when the LED point light source is weak in directivity of emitted light (Koike, col. 8, line 9-19).

Cited Prior Art

66. Any prior art already made of record and not relied upon is considered pertinent to applicant's disclosure. Additional cited art:

- i. Patent Abstracts of Japan Pub. No. JP 2005-038643 discloses a backlight device comprising a convex protrusion and an arc-shaped recess formed therein.
- ii. US Pat. No. 6,975,370 B2 discloses a backlight device comprising a plurality of arc-shaped recesses.
- iii. US Pat. No. 6,924,856 B2 discloses a backlight device comprising a two dimensional array of point light sources and a light guide plate comprising a two dimensional array of convex structures with each convex structure aligned with a point light source in the array.

Conclusion

67. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew P. Lawson whose telephone number is 571-272-9795. The examiner can normally be reached on Monday through Thursday from 8:00am to 6:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms, can be reached at 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew P. Lawson,
Examiner

MPL


ANDREW SCHECHTER
PRIMARY EXAMINER